

Remarks

Amendments to Claims

Independent claims 1, 7, and 10 are each amended to more clearly recite the invention. The forming tool portion of the tooling assembly, including the forming layer and the rearwardly expending support structures, is formed of an integral body of metal. Paragraphs 0005 and 0014 of the specification teach that the forming tool (14 in Figures 1 and 2) may be cast from a suitable tool alloy such as P20 steel or the like. Or the tool may be machined from a billet of P20 steel or the like. As illustrated in Figure 2, forming layer 16 with forming surface 18 are supported by integral exterior walls 26 and interior walls 28.

These independent claims (1, 7, and 10) are also amended to recite that heating elements of the tooling assembly are electrical resistance heating elements as stated in paragraph 0005. Paragraph 0015 describes electrical resistance heating elements 22 (Figure 2) inserted in holes formed in forming tool layer 16 and electrical resistance heating elements 22 inserted in holes 32 formed in exterior support walls 26 and interior support walls 28.

The Rejections

Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Carlson (3,584,487). Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson in view of McMillen (3,461,709). The Examiner is respectfully requested to reconsider and withdraw these rejections for the following reasons.

Response to the Claim Rejections

Independent claims 1, 7, and 10 each recite a forming tool apparatus that includes a forming tool with integral forming surface layer and support structures formed from a block of metal suitable for the tool's function. The tool is adapted for connection to, but thermal insulation from, a plate or press platen for carrying the tool in a forming press. Electrical resistance heating elements are embedded in the forming layer and, optionally, in the support structures (dependent claims 2 and 9). The heating elements are arranged for integrally heating the forming surface of the tool. The supporting structures can be heated to help control the temperature of the forming layer, but the thermally conductive structures also provide means for

reducing thermal losses from the forming surface. Thus, elevated temperatures at the forming surface of the tool can be maintained more closely and efficiently.

In independent claims 1 and 7 the integral supporting structures define at least one cell for thermal insulation. In independent claim 10 the rearward, supporting surface of the tool has blind passages for receiving support posts that are composed of a material having greater resistance to thermal conductivity than the forming tool. These lower conductivity posts complement other thermal insulation of the tool from the forming press and environment. The claimed integral forming tool thus provides a forming surface with electrical resistance heating capabilities and thermal insulation capabilities for maintaining a desired forming temperature at the forming surface.

The dependent claims add features for insulating the tool from heat loss from the forming surface. Neither the Carlson '487 patent nor the combination of Carlson with the McMillen '709 patent discloses the claimed forming tool assembly.

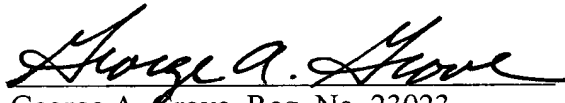
Carlson states at column 1, lines 29-48 that resistance heaters are unsuitable for use in his metal forming tool. As seen in Figure 3 and described at column 8, the Carlson tool comprises, in distinct layers, a forming layer (un-numbered in figure 3), a core 86 for induction heaters 88, an insulative material plank 146, a grooved plate 140 (for cooling), a metal base plate 138, and lower press bolster plate 60. Bolts 144, with foam insulation plugs 148, connect plates 138, 140, plank 148 and induction heating core 86. Contrary to the Examiner's assertion, bolts 148 and the foam insulation plugs 144 are not load bearing members, they are simply attachment members. A foam insulation material like plugs 144 cannot be considered a load bearing material. But the many other distinct layers of the tool assembly- core 86, plank 146, plates 138, 140- are each load bearing members piled on press bolster plate 60.

Clearly, the Carlson disclosure does not anticipate applicant's hot stretch forming apparatus as recited in claim 10. Carlson does not disclose an integral forming tool with a forming surface and a rearward surface with blind passages for low thermal conductivity, load bearing support posts. And Carlson certainly does not disclose a forming tool with embedded heating resistance elements. It is respectfully submitted that the rejection of Claim 10 as anticipated by the disclosure of the Carlson '487 patent is not correct. The Examiner is urged to reconsider and withdraw this rejection of claim 10.

It is also apparent that the combination of the Carlson '487 patent with the McMillen '709 patent does not teach or suggest the forming apparatus recited in claims 1-9. Carlson is relied on as showing the basic structure of the apparatus recited in claims 1-9, and McMillen is relied on to show the use of heating elements in a forming layer. But Carlson fails to teach or suggest the apparatus recited in these claims for the reasons stated with respect to claim 10. The Carlson forming body is not integrally heated and it is carried on several distinct underlying heating, supporting, cooling and insulating layers. McMillen does not make up for the deficiency in Carlson's forming tool design. The Examiner is also urged to reconsider and withdraw the rejection of claims 1-9 as being unpatentable over Carlson in view of McMillen.

It is respectfully requested that claim 1-10 be allowed and this case passed to issue.

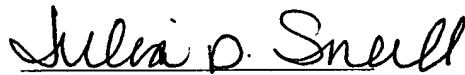
Respectfully Submitted,



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